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SUBJECT: Transmittal of *Engineering Evaluation/Cost Analysis for the Power Burst Facility Reactor Building Non-Time Critical Removal Action, Idaho National Engineering and Environmental Laboratory (Draft)*, DOE/NE-ID-11187, August 2004 (EM-ER-04-172)

Dear Mr. Ceto and Mr. Koch:

Enclosed please find copies of *Engineering Evaluation/Cost Analysis for the Power Burst Facility Reactor Building Non-Time Critical Removal Action, Idaho National Engineering and Environmental Laboratory (Draft)*, DOE/NE-ID-11187, and an issue paper providing a more detailed legal argument supporting the approach preferred by DOE. As discussed during our meeting at the DEQ office in Idaho Falls on July 19, 2004, this draft document is being provided for a two-week agency review. Please identify significant issues by August 11, and identify a two-hour period early in the week of August 16, to discuss resolution of issues. Since you will be in Idaho Falls for the public meeting on the proposed CPP-603A basin non-time critical removal action on August 19, please plan to review final document wording that afternoon.

The draft Engineering Evaluation/Cost Analysis (EE/CA) recommends Alternative 1 [removal and disposal of water in tanks and piping, followed by grouting the remaining substructure and contents in place, removal and disposal of the aboveground structure, and installation of a performance-based cover].

Alternative 2 [removal and disposal of water in tanks and piping, partially remove shielding lead, followed by grouting the remaining substructure and contents in place, removal and disposal of the aboveground structure, and installation of a performance-based cover] is technically implementable but DOE orders direct that DOE apply the ALARA principal (manage radiation exposure to be As Low As Reasonably Achievable). While Alternative 2 would accomplish removal of approximately 2/3 of the lead inventory; removal does not reduce risk to the aquifer


and does involve an increase in radiation dose to workers. DOE cannot recommend an action that requires increased exposure without a balancing reduction in long-term risk. The EE/CA concludes that Alternative 2 would not provide any practical benefit in reduction of risk to groundwater, or direct exposure risk, that would compensate for its substantially higher estimated worker radiation exposure (9.3 person-rem), increased risk of worker injuries, and increase in cost (\$4 million in net present value costs). For these reasons, Alternative 1 is DOE's preferred alternative. The EE/CA further concludes that implementation of Alternative 1 will need to meet the standards applicable to closure of a hazardous waste landfill.

Alternatives 3, 4, and 5 are deemed unacceptable. Alternative 3 [complete removal except for residual surface contamination] would result in an estimated worker exposure of up to 155 person-rem even with major technology development to reduce exposure and cost. No groundwater or direct exposure risk reduction benefit achieved for the substantially higher worker risks and costs. Alternative 4 [interim safe storage] is unacceptable, because it would simply stabilize the facility, delaying final closure to the future. Alternative 5 [no action] is not acceptable, because it would not meet the removal action objectives.

We look forward to further discussing these conclusions with you in greater detail upon completion of your review of the draft and detailed legal position. Our consensus determination will be published in the final version of the EE/CA. Specifically, for the alternatives where waste may be left in place, landfill post-closure requirements will apply, either through incorporation in the design of this removal action as applicable or relevant and appropriate requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (42 USC § 9601 et seq.), or through submittal of an application for a HWMA/RCRA (Idaho Code 39-4401 et seq.; 42 USC § 6901 et seq.) landfill post-closure permit, and in either case will include a written commitment to long-term monitoring. Both of these options for meeting the post-closure requirements are considered viable and legally available approaches for DOE to commit to fulfill the landfill closure standards. Although the draft EE/CA mentions both options, DOE intends that the final EE/CA will reflect only one of these approaches, and that the selected regulatory approach for any long-term monitoring will be mutually agreed upon between DOE/NE-ID, DEQ, and EPA, following your agencies' review of this draft EE/CA.

If you should have any questions about these documents, please call me at (208) 526-4392. I would like to use the FFA/CO conference call on August 9 to confirm the time for a conference call for comment resolution.

Sincerely,



Kathleen E. Hain
Lead, CERCLA Program

7/30/04

HWMA/RCRA Regulatory Basis For Alternative 1 of the PBF Reactor EE/CA [Leaving Lead in the PBF Reactor Substructure]

Introduction

A CERCLA Non-Time Critical Removal Action (NTCRA) is planned for final decontamination and decommissioning of the Power Burst Facility (PBF) reactor structure. Five alternatives for the CERCLA NTCRA have been developed. Alternatives 1, 2, and 3 include removal of the above-grade portions of the reactor building and entombment of the below-grade structure into a monolith by filling the basement with grout or soil. Alternative 4 includes removal of the above-grade portions of the reactor building and then providing interim safe storage for the remainder of the facility. Alternative 5 is a "no-action" alternative. In addition to radionuclide contamination, the basement also contains approximately 13 cubic meters (322,000 lbs) of lead and minor amounts (147 lbs.) of cadmium sheeting. The cadmium sheeting is associated with the fission product detection system in Cubicle 13. The primary differences between Alternatives 1, 2, and 3 is how much of the lead would be removed.

The INEEL has been completing applicable Hazardous Waste Management Act/Resource Conservation and Recovery Act (HWMA/RCRA) actions prior to undertaking the NTCRA. The INEEL is completing the final actions as identified under the Voluntary Consent Order (VCO) NEW-PBF-001 action plan for those potential HWMA/RCRA materials in the PBF reactor structure considered waste at the time of the signing of the VCO. Items addressed under the VCO include characterization of tank contents, removal and disposition of lead (38,000 lbs.), and characterization and disposition of other components and equipment. The only potential HWMA/RCRA materials that will be addressed under the NTCRA are approximately 13 cubic meters of lead and the minor amount of cadmium sheeting. At issue is how to apply the HWMA/RCRA regulations to the 13 cubic meters of lead and a minor amount of cadmium sheeting under the NTCRA.

In Alternative 1, the 13 cubic meters of lead and minor amount of cadmium sheeting would be left in place. Alternative 1 is the INEEL's preferred alternative. A number of potential HWMA/RCRA items have already been characterized and dispositioned under the VCO. In addition, removal of all 13 cubic meters of lead and minor amounts of cadmium sheeting is not possible due to high radiation. Finally, removing part of the lead and cadmium under Alternative 2 increases the risk to the worker and, due to the diminishingly small risk of releases of the lead or cadmium after grouting, partial removal provides no material benefit in reduced risk to groundwater or direct exposure and conflicts with the safety principles of keeping radiation exposure As Low As Reasonably Achievable (ALARA) under the Atomic Energy Act.

This paper provides the INEEL's regulatory basis for Alternative 1.

Regulatory Basis

There are two potential options available for addressing the 13 cubic meters of lead and minor amounts of cadmium. One could be application of the HWMA/RCRA requirements for storage/treatment units. The other is application of the HWMA/RCRA requirements for landfills.

Through past Federal Register (FR) preamble language, EPA appeared to lay down a fundamental difference in the strategy for regulating storage or treatment units and disposal units. By definition, a storage unit held waste temporarily and the waste, including residues, are removed from the site at

closure. A disposal unit, by definition, is closed with wastes and residues in place and contamination remains at the site after closure (57 FR 8706, March 19, 1987). Closure strategies for both types of units are based on temporary versus long-term containment objectives.

If the 13 cubic meters of lead and a minor amount of cadmium sheeting were being managed in a HWMA/RCRA interim status or permitted storage/treatment unit, then clearly the Subpart G closure and post-closure requirements (40 CFR 264 or 265.114), and storage/treatment unit specific closure requirements (40 CFR 264 or 265.197, 228, 258 or 280) would apply. In the typical HWMA/RCRA storage/treatment (non-land based) unit closure process, owners and operators are required to remove or decontaminate all soils, structures and equipment at closure, if doing so would be necessary for the closure to meet the performance standard of 40 CFR 264.111 or 265.111. This is necessary since storage/treatment units are usually not designed to act as disposal units (63 FR 56710, October 22, 1998). The 40 CFR 264.111 or 265.111 requirements specify that the "owner or operator must close the facility in a manner that: (a) Minimizes the need for further maintenance; and (b) Controls, minimizes or eliminates, to the extent necessary to protect human health or the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters, or to the atmosphere".

However, the 13 cubic meters of lead and small amounts of cadmium are currently not regulated under the 40 CFR 264 or 265 requirements for storage/treatment facilities. The 13 cubic meters of lead and cadmium will become a HWMA/RCRA solid waste when abandoned in-place (disposed) by entombment. According to OSWER directive PPC 9487.1986(04), "...permanent placement of hazardous waste, including perpetual 'storage' in above-ground land emplacement facilities, falls into the regulatory category of land disposal." Entombment of the lead and cadmium would be considered land disposal and the entombed facility would be a HWMA/RCRA hazardous waste landfill.

In several instances, EPA has provided a regulatory strategy for closing different types of storage/treatment units. These strategies were included in preambles to the final rules for closing container storage units, tank systems, waste piles, and surface impoundments. EPA indicated that closure requirements for container storage units should be consistent with closure requirements for tanks (i.e., remove waste and residues), and remove contaminated containment systems and soil that could not be decontaminated (46 FR 2831, January 12, 1981). EPA further indicated that closure requirements for tanks paralleled closure requirements for waste piles (51 FR 25456, July 14, 1986). EPA also indicated that the closure strategy for waste piles was identical to the first alternative for closing surface impoundments (47 FR 32324, July 26, 1982).

In the preamble for regulating waste piles and surface impoundments that actively managed RCRA hazardous waste, EPA acknowledged that at some storage units it may not be practicable to remove or decontaminate all residues, soils and containment systems. The owner of a waste pile who could not reasonably remove or decontaminate the containment systems, subsoils, structures and equipment would be required to close the waste pile in accordance with landfill closure requirements (47 FR 32324, July 26, 1982). Owners of closing surface impoundments had two options. The first option was to remove and decontaminate to the same standard as waste piles, and the second option was to close with waste in place, cap the unit, and perform post-closure care. As early as 1980, EPA indicated that the owner of a surface impoundment had a choice whether to avoid post-closure care by removing waste or to leave waste in place and close as a landfill (subject to regulatory agency approval) (45 FR 45 33203, May 19, 1980).

Regardless of whether a hazardous waste TSD unit is closed under the storage/treatment unit requirements, or as a disposal unit, the primary focus of the HWMA/RCRA closure regulations is to ensure that the performance standards of 40 CFR 264.111 or 265.111 are met. As mentioned

above, those standards require that the closure actions minimize the need for further maintenance and protect human health and the environment by controlling, minimizing or eliminating post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off or hazardous waste decomposition products to the ground to surface waters or to the atmosphere.

A streamlined risk assessment was prepared to address this NTCRA and is presented in the Engineering Design File entitled "Groundwater Pathway Risk Assessment for the PBF Closure" (EDF-4869). The streamlined risk assessment indicates that entombed lead and cadmium will meet the performance standards of a closed HWMA/RCRA landfill. Therefore, the removal of any additional lead or cadmium beyond what has already been removed does not provide any material benefit since the regulatory performance standards are met without the additional removal.

Summary

This paper was prepared to articulate the INEEL's HWMA/RCRA regulatory basis for Alternative 1 of the PBF Reactor EE/CA. There are two potential options available for addressing the 13 cubic meters of lead and minor amounts of cadmium. One could be application of the HWMA/RCRA requirements for storage/treatment units. The other is application of the HWMA/RCRA requirements for landfills. Given the added radiation exposure and increased risk to workers while handling the lead and cadmium, it is prudent to evaluate all options available to maximize worker safety. A number of potential HWMA/RCRA items have already been characterized and dispositioned under the VCO. In addition, removal of all 13 cubic meters of lead and minor amounts of cadmium sheeting is not possible due to high radiation. Finally, removing part of the lead and cadmium under Alternative 2 increases the risk to the workers and, due to the diminishingly small risk of releases of the lead or cadmium after grouting, partial removal provides no material benefit in reduced risk to groundwater or direct exposure. For these reasons, a regulatory basis for creation of a HWMA/RCRA landfill is provided. The following is a summary of the regulatory interpretation.

Disposal of the lead and minor amount of cadmium through entombment would be an act of "discarding" and it would, at that time, become a solid waste and therefore constitute the creation of a HWMA/RCRA hazardous waste landfill, subject to the requirements for closure of a hazardous waste landfill. It is clear that EPA does not generally require waste removal from disposal units. In fact, EPA allows owners and operators of surface impoundments and waste piles to choose to either remove or decontaminate all hazardous waste and constituents from the unit, or leave waste in place and install a final cover over the unit and conduct post-closure care. (63 FR 56710, October 22, 1998). Since landfill closure requirements are applicable, and landfill regulations do not require removal of hazardous waste from disposal units, removal of the 13 cubic meters of lead and minor amount of cadmium is not required. If the lead and cadmium were in a storage/treatment unit that held waste temporarily, those closure requirements would require removal of the waste. However, removal of waste is not a requirement that applies to landfills.

If it is assumed that a requirements to remove lead and cadmium to the extent practicable applied, then the principles of worker safety (ALARA) and other factors of practicability would apply. Considering the substantial increase in radiological exposure and risk to workers would add no benefit to protection of the environmental or public health, the added worker exposures and risks are not justified.